

farce of the "reserve" system at present is, first, that the local white and black population do not obey the law, and the local authorities seldom enforce it, and second, that the Government is somewhat too ready to set aside the law in favour of distinguished sportsmen.

In no book which the reviewer has yet seen have the great beasts, the landscapes, and the people been more admirably photographed than in this work on Zambezia, while at the same time due justice is done to the Portuguese towns, the Portuguese officials, and generally to such civilisation as Portugal has been able to introduce into these lands.

H. H. JOHNSTON.

#### PELLAGRA AND ITS CAUSE.

A GOOD deal of notice has been taken lately in medical journals and in the newspapers of the disease pellagra. It is difficult for British folk to realise the scourge this disease causes in many countries, but chiefly in Italy, Roumania, Spain, Tyrol, and other countries in south-eastern Europe. In the United States of America, pellagra has spread recently to an alarming extent, and in several British colonies and protectorates, markedly the West Indies and Egypt, pellagra is a serious ailment. Persons who contract the disease present a train of symptoms which may be summarised as follows:—"sunburning" of face, neck, chest, and hands is an early and very prevalent manifestation; stomacic and intestinal catarrh; feverishness; skin rash; lassitude and weakness. Spring and autumn recurrences continuing for years further tend to mental excitement and bodily weakness, leading all too frequently to lunacy and a fatal issue.

The disease has hitherto been attributed to eating damaged maize, which is so largely consumed as "polenta," the "porridge" of Italy. In the United States maize is termed Indian corn, and under various names it is used in many countries. In 1905 Dr. L. W. Sambon, at a meeting of the Tropical Section of the British Medical Association, criticised the accepted theory, pointing out that pellagra did not seem to be a food disease or due in any way to unsound maize, but that in all probability it was due to a parasite—a protozoon. Dr. Sambon supported his theory by arguments based upon the well-established principles applicable to protozoal infections, and put in a form which appealed to men of science. His theory gained adherents until it gradually came to be considered a duty to humanity and to science that the question should be fully inquired into. With this object in view, a Pellagra Investigation Committee was formed in London by Mr. James Cantlie, and Dr. Sambon was sent to Italy on March 20, 1910.

At present the field commission in Italy, consisting of Dr. Sambon and his assistants, is engaged in inquiring into the epidemiology of pellagra. Many pellagrous districts in northern Italy have been visited and the banks of the streams searched for possible carriers of the disease. The field commission has come to the conclusion that pellagra occurs amongst the cultivators and not amongst the consumers of maize; that it is the agricultural labourer, not the town dweller, who suffers from pellagra, and that it is whilst working in the field that the labourer becomes infected. In a telegram dated Rome, May 13, and published in the *Times*, May 14, Dr. Sambon states that it "has been definitely proved that maize is not the cause of pellagra." In addition the telegram assures us that "the parasitic conveyer is the *Simulium reptans*."

The *Simulium* is a species of fly commonly called a "sandfly"; its larvæ are met with on the rocks and stones along the streams in pellagrous countries, and Dr. Sambon seems to connect this fly with the spread of pellagra.

So far as we know, Dr. Sambon has not found the parasite, nor is there direct proof that the *Simulium* is the actual carrier. That he has found cause for the statement that eating maize is not the cause of this disease is highly probable, for several men of science, such as Babes (Roumania) and Alessandrini (Rome), have declared in favour of Sambon's theory, and have been working on the lines suggested by him for the elucidation of pellagra. Even with the announcement above quoted, stating what work has been done, there is much yet to do. Questions of the kind are not settled in a day, and it may take years of inquiry before we have finally settled what Dr. Sambon has so well begun.

The fact that it is a duty to humanity and to science that pellagra should be investigated does not provide the necessary money, and the committee in London has endeavoured to keep the inquiry going by appealing to friends to help. So far some 245l. have been actually collected, and further sums have been guaranteed; but even should the Government favour the work by contributing the 150l. which the committee was led to believe might be the case, the sum is quite inadequate, and unless further donations are speedily to hand the field commission must be recalled from Italy in a fortnight. Sir Lauder Brunton, Bart., is the chairman of the committee; Prof. F. M. Sandwith vice-chairman; the bankers are the London and South-Western Bank, Great Portland Street branch; and donations may be sent to the treasurer, Dr. Clement Godson, 82 Brook Street, W., or to Mr. James Cantlie, 140 Harley Street, London, W., honorary secretary, Pellagra Investigation Committee.

#### NOTES.

FOR some time past a scheme for the distribution of time signals by wireless telegraphy has been mooted with the view of assisting navigation and for the determination of longitude. The Eiffel Tower in Paris and the summit of Teneriffe have been proposed as suitable sites for the emission of these signals, and we now learn that the plan for which M. Bouquet de la Grye and Commandant Guyou are more especially responsible is so far complete that the first signals were dispatched from the former station at midnight on May 23. The Paris correspondent of the *Morning Post* states that Paris time was transmitted from the observatory by way of the Eiffel Tower by wireless telegraphy to all wireless stations and ships fitted with wireless apparatus within a radius of between 2500 and 3000 miles. The system is an automatic one, and a Morse sign is sent into space first at midnight, again two minutes after midnight, and, finally, four minutes after midnight. Thus, steamers furnished with wireless telegraphic apparatus will no doubt be placed in a more favourable position, but the suggestion that has been made in some quarters, that chronometers can be dispensed with, seems premature. The receipt of a signal will not enable a ship to determine its position or even its longitude. All it will do is to give the error of the chronometer. The ship's officers will not be able to forgo the use of Sumner lines and other devices, and for these the knowledge of local time and the use of a ship's chronometers will be convenient. It may be desirable to point out here what is the kind of error in longitude to which in these days of accurate navigation a ship is liable, or what is the

amount of error which the employment of telegraphic signals can correct. Of course, the error accumulates with the time at sea, but a ship that carries three chronometers, the usual number in a well-found ship, should not after 100 days be in doubt about the longitude by a greater quantity than twenty seconds; usually it is much less. At the equator this would amount to an uncertainty of about five miles, in the longitude of Paris correspondingly less; but the number of time signals scattered over the world is now so large that every steamer has the opportunity of correcting its chronometers much more frequently than is suggested here. While, therefore, we welcome every advance which increases accuracy and demonstrates the value of scientific application, we cannot consider that the practical benefits of the scheme will be immediately apparent.

MR. J. B. TYRRELL has been elected president of the Canadian Institute, the oldest scientific society in Canada.

WE regret to see the announcement of the death, on May 23, at eighty years of age, of Mr. J. B. N. Hennessey, F.R.S., late deputy surveyor-general in charge of the Trigonometrical Surveys, Survey of India.

IN consequence of the death of King Edward, the council of the Institution of Civil Engineers has decided not to hold a *conversazione* this year. The eighteenth "James Forrest" lecture will be delivered at the institution on June 22, at 8 p.m., as already announced.

PROF. R. W. WOOD, of the Johns Hopkins University, Baltimore, will spend the coming autumn, winter, and spring in England and on the Continent. He has accepted invitations to deliver the Thomas Young oration of the Optical Society and the Traill Taylor lecture before the Royal Photographic Society, and will arrive in London early in October.

ON Tuesday next, May 31, Mr. C. J. Holmes will begin a course of two lectures at the Royal Institution on "Heredity in Tudor and Stuart Portraits"; on Thursday, June 2, Major Ronald Ross will deliver the first of two lectures on "Malaria"; and on Saturday, June 4, Prof. J. A. Fleming will commence a course of two lectures on "Electric Heating and Pyrometry" (the Tyndall lectures).

THE King, on the recommendation of the Home Secretary, has approved of the reconstitution of the Royal Commission on Mines for the purpose of an inquiry into the health and safety of persons employed in metalliferous mines and quarries. The new commission will consist of Sir Henry Cunynghame, K.C.B. (chairman), Mr. R. A. S. Redmayne, Dr. J. S. Haldane, F.R.S., Mr. John S. Ainsworth, M.P., Mr. R. M. Greaves, Mr. R. Arthur Thomas, Mr. R. T. Jones, Mr. W. Lewney, and Mr. U. Lovett.

DURING the Whitsuntide excursion of the Geologists' Association to Swanage, Mr. John Newton obtained a well-preserved upper jaw of the small mammal *Triconodon* from the Lower Purbeck beds. The specimen was found in the fresh-water limestone above the well-known mammal-bed, which was carefully examined at two places in Durlstone Bay without success. It appears to be the first discovery of a mammalian fossil in the Purbeck beds since 1880, when Mr. Edgar Willett obtained the lower jaw of *Triconodon* now in the Museum of Practical Geology. Mr. Newton has placed the new fossil in the British Museum (Natural History), where it will be exhibited with the Beekles collection.

DURING the next few weeks the Somersetshire Archaeological and Natural History Society will commence the excavation of the lake village at Meare, three miles north-west of Glastonbury. Besides interesting mediæval buildings, such as the Fish House and the Manor House, the parish contains the remains of a lake village much larger than that of Glastonbury. Trial excavations have already disclosed many interesting objects, and the thorough examination of the site will certainly prove to be of much importance in elucidating the history and antiquities of the late Celtic period, dating back a century or two before the Christian era. Assistance, which is much needed in support of the excavation fund, will be gladly received by the secretaries, Taunton Castle, Somerset.

THE series of aeronautical calamities which figures so prominently in the issue of the *Deutsche Zeitschrift für Luftschiffahrt* for April 20 is continued in the issue for May 4, where the destruction of the *Zeppelin II.* at Weilburg, and that of the Delitzsch balloon, which was struck by lightning on April 6, are described and figured. In addition, there are figures and references to accidents to Rougier's and Chavaz's machines at the Nice aviation meeting, the former having fallen into the sea and been picked up by a steamer.

M. JACQUES DE LESSEPS, grandson of the engineer of the Suez Canal, crossed the English Channel on May 21 in a Blériot monoplane. Instead of a three-cylinder Anzani motor of 25 horse-power, such as was used by M. Blériot, M. de Lesseps employed a seven-cylinder Gnome rotary engine of 50 horse-power. He started from Les Baraques, near Calais, at 3.40 p.m., and landed close to Wanston Court Farm, near St. Margaret's, at 4.17 p.m. According to the French Press, the crossing took thirty minutes, as compared with M. Blériot's thirty-one minutes' flight. M. de Lesseps reports that he travelled at a height of from 350 to 400 metres to avoid the fog, which obscured his view, and that he was unable to make use of a compass on account of the effect of the great vibration upon the instrument. By his successful flight M. de Lesseps wins the Ruinart prize of 500*l.* and the 100*l.* cup offered by the *Daily Mail* for the second airman to cross the Channel in the air.

IN an article on the London to Manchester flight (*NATURE*, May 5) reference was made to the desirability, now that the possibility of long-distance flights has been clearly demonstrated, of devising means for encouraging the pursuit of aviation without taxing the physical endurance of aviators or subjecting them to risks more than was necessary. From an article in the *Deutsche Zeitschrift für Luftschiffahrt* we gather that the arrangements made at the Nice aviation week afforded an excellent example of what could be done in this direction. In the first place, the long-distance flights were performed mainly over the sea between Cap Ferrat and Cap d'Antibes, where steamers were available (in the language of the *Zeitschrift*) to "fish out" any aviator who descended, and this actually happened to Latham; in the next place the prizes offered included a cumulative prize for the longest total distance covered, excluding individual flights of less than 5 kilometres, and prizes were also offered for the quickest flight performed on each day, the best start and the best landing, so that the chances of success were less dependent on meteorological conditions than they would have been if competitions at fixed hours had alone been provided for. That progress is being made in *aérotechnics* was shown by the fact that while at Berlin last year flights were only made when the wind velocity was less than 3 metres per

second, the anemometer at Nice often showed velocities of 7 to 10 metres per second without interfering with the flyers. It is interesting to note that the starting place was close to the mast where the late Captain Ferber made his early experiments. The writer also refers to the liberality of the citizens of Nice and others in contributing to the prize funds.

A spell of really warm weather occurred over the British Islands, and the weather report for the week ending May 21, issued by the Meteorological Office, shows that the shade temperature was everywhere above the normal, the mean for the period ranging from about 3° to 6° in excess of the average in different parts of the kingdom. The warmest district was the south-east of England, where the mean was 58°, and the absolutely highest temperature was 83°, at Hillington, in the east of England, on May 20. The lowest shade temperature anywhere was 37°, but slight frost occurred in the open in several places. The mean temperature of the sea was considerably higher than during the preceding week on many parts of the coast, and was generally higher than in the corresponding week of last year. The rainfall was mostly in excess of the average, and the aggregate measurement since the commencement of the year is largely in excess of the average, the excess being more than 3 inches in several of the northern and western districts. There was a good deal of sea fog and mist along the east and north-east coasts of Great Britain. Thunderstorms were very common in England, and rather so in Scotland and the south of Ireland. On May 20 and 21 they occurred over a wide area in Great Britain, and several persons were killed by lightning.

In our issue of December 2 last full particulars were given of the eighth International Zoological Congress which is to be held at Graz (Austria) on August 15-20 next, under the presidency of Prof. Ludwig von Graff. We have received a second circular in connection with the congress which gives much practical guidance to foreign visitors. It is pointed out that as the most direct route to Graz is *via* Vienna, many of the scientific institutions of that city have made arrangements to receive foreign visitors during August 12 and 13. Arrangements are being made to secure a reduction of fares on the Austrian railways. The circular also provides full details of the numerous excursions which have been arranged. We may remind zoologists that all inquiries relative to the congress should be sent to the Präsidium des VIII. Internationalen Zoologenkongresses Graz (Österreich) Universitätsplatz 2.

It is with great regret that we have to announce the death of M. Bernard Brunhes, the director of the observatory of the Puy de Dôme. M. Brunhes died at the early age of forty-seven, and had been in charge of the observatory for only the last nine years, but he brought to its administration a high reputation for capacity and industry, qualities which were recognised while a student at the Sorbonne, and had been further developed during his occupancy of important scientific positions both at Dijon and Clermont-Ferrand. Under his directorship the observatory won a prominent position for researches in the several departments of terrestrial magnetism, the physics of the earth's crust, and the exploration of the upper atmosphere. M. Brunhes will be particularly remembered for his researches in meteorology, in which mechanical contrivances could be employed to elucidate physical phenomena. With considerable ingenuity he discussed the mechanical action exerted by a horizontal current of air upon a whirlwind, having sinistrorsal and dextrorsal motion about a vertical axis susceptible of lateral displacement.

Another subject which engaged his attention was the effect of a want of symmetry in the action of running water, as exhibited in the erosion effects upon opposite banks of rivers. His reputation must, however, rest mainly on the work of weather forecasting, to which purpose the activities of the observatory were chiefly directed. He held in scorn those who attempted forecasting without any knowledge of the general movement of the atmosphere, and on the occasion of the proposal of the sensational scheme for competition in weather forecasting, his denunciation of those who, to acquire a little brief notoriety, were willing to run the risk of bringing science into disrepute was both merited and timely. As a writer of scientific treatises intended to make science popular, he was exceedingly successful. In crystallography, terrestrial magnetism, and meteorology, his books have been welcomed as models of clearness and accuracy, while his latest work on "*La dégradation de l'Énergie*" has won a well-deserved approval.

THE scientific side of geographical exploration has suffered a severe loss by the death of Lieut. Boyd Alexander, in the Sudan, at thirty-seven years of age. From information received at the Foreign Office it appears that Lieut. Alexander was killed at Nyeri, about seventy miles north-east of Abeshr, the capital of Wadai, on April 2, a few days before the French troops met and defeated the native bands opposed to the French occupation of the country. Lieut. Alexander began his career as a traveller-naturalist in 1897 by an expedition to the Cape Verde Islands, and in the following year he made expeditions to the Zambezi and Kafue Rivers. In 1904 he visited Fernando Po, and made some valuable ornithological observations. His most important work, however, was accomplished during the Alexander-Gosling expedition of 1904-7, which crossed the African continent from west to east. One of the objects of this expedition was to study the distribution of the fauna between the Niger and the Nile from the point of view of zoological relationships between the west coast region and the Nile basin. The expedition mapped a large area, made systematic observations of the natural history and ethnology of the region traversed, and secured collections of great value to science. For this achievement Lieut. Alexander was awarded the gold medal of the Royal Geographical Society. Toward the end of 1908 he left England for further zoological and geographical explorations, and was in the German Kamerun Colony during the great earthquake in that part of Africa about a year ago, and the subsequent eruption of the Kamerun Mountain. He then passed to the Lake Chad region, and at the time of his death appears to have been making his way to the Nile by the north of Wadai and Dafur. It is greatly to be deplored that this adventurous journey has deprived science of an explorer and naturalist of such great distinction and promise.

WE learn from the *Builder* for May 21 that next year, in connection with her International Exhibition, Italy will inaugurate the great national monument to Victor Emmanuel, which has been a quarter of a century in building, and has cost an immense sum of money. By its importance, and, on the whole, by its artistic excellence, it is worthy of the patriot king. The breadth of the monument is 460 feet and its depth 480 feet. Standing on a spur of the Capitoline Hill, it is one of the most prominent objects in the City of Rome. On a lofty pedestal in the midst of a stately lay-out of steps and terraces stands the colossal equestrian statue of "*il régalant'uomo*" by Enrico Chiaradia. It is approached from below by a stair 130 feet wide in four flights of convex plan, and as a background it has a gigantic



colonnade of concave plan backed by a wall parallel to it. At either end of this are square open halls decorated internally with coloured marbles, and supporting quadriga groups. Among the many works of sculpture by Italian artists is a fine series of statues personifying the provinces of Italy—Latium, Lombardy, Venetia, and so forth. The architect was Count Giuseppe Sacconi, who died in 1906 without having seen the completion of the monument.

In the *Cairo Scientific Journal* for February Mr. Harold Sheridan gives an account of that curious musical instrument, the *rabāba*, which was introduced into Europe by the Crusaders, and, with a slight modification of the original name, is now known as the rebeck. It has certainly been evolved from the one-stringed lyre of the early monuments, the single string twanged with the finger developing into the present double-stringed instrument played with a rude bow and provided with a body. Even in its present state it is a most primitive instrument, made up in the rudest way out of a long iron nail, a cocoa-nut, a few strands of horse-hair (that of the living animal being most in request), a piece of fish-skin, and sundry pieces of wood. The last are coarsely glued together, and the body is made of half the cocoa-nut, over which a piece of moist skin—that of the Nilotic fish known as the *bayad*—is tied tightly until it dries. The tone is regulated by incisions made in the body, those being most numerous when the tone is intended to be loud, and this is further regulated by moving the bridge. The *rabāba* is thus of considerable interest as marking an early stage in the evolution of the modern violin.

A MEMOIR issued in the Eugenics Laboratory Series (Dulau and Co.), by Miss Ethel M. Elderton, assisted by Prof. Karl Pearson, discusses the influence of parental alcoholism on the physique and ability of the offspring. The memoir is based on two series of data, the one contained in a report of the Edinburgh Charity Organisation Society, the other in an unpublished report, by Miss M. Dendy, on the special schools of Manchester, and relating only to families in which one child was sufficiently defective to be educated in such a school. Very little trace of any unfavourable influence of the parental alcoholism is found. The mean heights and weights of the children of sober parents are, on an average, slightly greater than those of the children of alcoholic parents, age for age, but the difference is extremely small, and the general health of the children of intemperate parents appears to be rather the better of the two; cases of tuberculosis and of epilepsy are stated to be markedly less frequent than amongst the children of sober parents. No marked relation of either sign is found between parental alcoholism and the intelligence of the child. The data of the Edinburgh report as regards the extent of parental alcoholism are rather remarkable. A school of a "widely representative character" was chosen for investigation, and the fathers of more than half the children in this school, and the mothers of more than one-third, are classed under the headings "drinks" or "bouts," i.e. are judged to be drinking more than is good for them or their homes.

ACCORDING to the report for 1909, the Field Museum at Chicago extended its operations, and at the same time largely increased its collections, by the dispatch of expeditions to Tibet, the South Sea Islands, and the Philippines, and smaller parties to Guatemala, New Guinea, Fiji, &c., while important collections have been acquired by purchase from Egypt and New Guinea. To make room for these, obsolete and unsatisfactory specimens have been removed from the exhibition galleries, while economy of

space has been gained by re-arrangement of the store-collections. Among striking additions to the public galleries, special reference may be made to the Tonopah meteorite from Nevada, weighing nearly two tons, to a pair of African elephants mounted in striking attitudes, and likewise to a fine male gorilla.

AFTER mentioning his regular attendance, when Prince of Wales, at the meetings of the trustees at the Natural History branch of the British Museum, the *Field* of May 14 states that in the early 'nineties, when Sir William Flower commenced to replace the old specimens in the mammal galleries by well-selected examples of modern taxidermy, the late King gave instructions that a series of rats, rabbits, and hares should be trapped on the Sandringham estate and forwarded to the museum, and it is these by which the species are still represented in the British saloon. To the late King the museum is also indebted for the skull and the mounted heads of three Spanish draught oxen, an Indian wild boar, and, in some degree, the makhna (tuskless) male Indian elephant, Jung Pershad. King Edward's last gift to the museum was the skeleton of Persimmon. The only specimen in the bird gallery presented by his late Majesty, when Prince of Wales, is a fine Reeves's pheasant, shot in the Sandringham coverts in 1890. It was, however, at the late King's suggestion that Mr. Andrew Carnegie presented the model of the skeleton of *Diplodocus* to the museum.

In the May number of the *American Naturalist* Dr. W. J. Holland, director of the Carnegie Museum, Pittsburgh, discusses the views recently expressed—particularly those of Dr. Tornier—with regard to the proper position and pose of the limbs of *Diplodocus* and other sauropod dinosaurs. Early in his criticism the author takes occasion to emphasise the marked distinctness of the Dinosauria from all other reptiles, a circumstance which is of itself in some degree sufficient to render it probable that their limbs may have approximated to the mammalian type in regard to the relative position of their bones. Important evidence in support of this is afforded by the compressed, instead of depressed, form of the thoracic cavity, which appears absolutely incompatible with limbs arranged after the crocodilian fashion. It is also shown that if the femur is placed, as Dr. Tornier suggests, in a horizontal plane, its head cannot be made to enter the acetabular cavity of the ilium, while, on account of projections, no movement would be possible. Further, in this mode of restoration the distal articular surfaces of both humerus and femur would project at right angles to the axes of the bones of the lower segment of the limbs without being opposed to the corresponding articular surfaces of the latter. After a reference to the extraordinary position which would be assumed in certain circumstances by the fore-limbs of *Diplodocus* according to the new restoration, Dr. Holland maintains that the form given to the limbs in the skeleton in the Natural History Museum is in all essential features correct.

EGGS with two yolks occur not uncommonly, but eggs with three yolks are exceptionally rare. Such an egg was recently laid by a barred Plymouth rock pullet at the Maine Experiment Station, and is described in some detail in a Bulletin recently issued. The egg was somewhat above the average size, but no other abnormal feature was noticed.

In past years, when sugar cultivation was the only industry of importance in Barbados, it was customary to issue annually a bulletin on sugar-cane experiments, but now that the cotton industry is developing so rapidly, it

has become necessary to issue a report on similar lines to those already sent out from other West Indian colonies. The first of these, which has been sent to us, contains an account of the sugar experiments which are still being continued, of experiments to find more suitable types of cotton than those at present in cultivation, and on important food crops such as sweet potatoes, cassava, eddoss, and tannias.

THE March number of the *Journal of the Board of Agriculture* contains an article by Mr. A. D. Hall summarising the results of trials at Rothamsted on the new nitrogenous fertilisers, cyanamide and calcium nitrate ("nitrate of lime"). Both proved equally as effective as sulphate of ammonia and nitrate of soda in increasing the yield of grain, but the nitrates were perhaps the better for straw production. Sulphate of ammonia and cyanamide gave somewhat less offal corn than the nitrates—10 per cent. of the total, against 13 per cent.—but the differences throughout are so small that they may be disregarded. The choice between the manures will therefore be dictated by their relative price and by the character of the soil.

THE results of the experiments carried out by the scientific staff of the Royal Agricultural College, Cirencester, have hitherto appeared in the *Agricultural Students' Gazette*, but it has now been decided to publish them in a separate journal, the first issue of which has reached us. Summaries are given by Prof. Kinch of the experiments on grass land carried on continuously since 1888, the general result being that nitrogenous and phosphatic manures are particularly necessary, and the addition of potassium salts desirable, over a long series like the present. The cereal experiments (barley from 1885-91, oats from 1894-5) are also described, together with others that have gone on for a shorter period. A meteorological summary would add to the interest of these papers. Whilst there are many advantages in separate college bulletins for the publication of demonstration results, we hope that all papers of general interest bringing out new facts will appear in the recognised journals, where there is no risk of them being overlooked.

IN the Bulletin of the Cracow Academy, 1909 (June and November), Dr. Maryan Smoluchowski discusses the instability or "buckling" of elastic plates and its applications to problems of mountain formation.

IN the Journal of the Royal Statistical Society, lxxiii., 1 (1910), Mr. G. Udny Yule gives a solution, based on probability considerations, of the problem of the distribution of deaths with age, based on the supposition of a succession of causes of death which act cumulatively, and he considers applications to deaths in man caused by disease and to the extinction of bacteria by successive applications of disinfectants.

IN the *Popular Science Monthly* for March and May Prof. John B. Smith gives an address on "Insects and Entomologists: their Relations to the Community at Large." While the first article deals with insects in their economical aspect, the second consists of a collection of biographical notices, with portraits of the principal entomologists of America.

DR. JEAN MASCART, of the Paris Observatory, has issued a list of errata which he has discovered in Borda's classical tables of logarithms. It is interesting to note that the tables were completed by Borda by the year 1792, but were not all in print at the time of the author's death. The publication was concluded by Delambre, who carefully checked them with the help of Brigg, Vlacq, Véga, Hobert,

and Ideler, and the present list evidently represents purely typographical errors which escaped notice, and which would probably in most cases be obvious to anyone who happened to take these particular logarithms from the tables.

THE assessment of income-tax is a question which does not, as a rule, fall within the purview of a scientific journal. We have, however, received a reprint from the *Daily Telegraph* of an article on this subject by Mr. William Schooling (London: Constable and Co., 1910), in which the author proposes a substitute for the present illogical and unscientific system of graduation. According to his system, the tax which a man pays would increase continuously with his income, as shown by a continuous graph. Under the existing system the tax increases discontinuously at certain points where the rate becomes infinity in the pound, and the amount of the tax depends, not only on a man's income, but on whether this income falls on a lucky number such as 4999 or on an unlucky number such as 5001, the man in the latter case paying more and receiving less than in the former. Mr. Schooling's system is much more rational and scientific, and has all the advantages which he claims for it.

THE illustrated catalogue of microscopes and accessories recently issued by Messrs. Flatters and Garnett, 32 Dover Street, Manchester, provides a very full list of apparatus by leading English and foreign makers for which they act as agents, and numerous sundries, some of which are the special designs of the firm. Among these are the hand microtomes provided with discs for regulating the thickness of sections and arrangements for keeping the paraffin blocks steady. The firm also specialises in turn-tables, water-baths and ovens, and slide cabinets.

WE have received separate copies of several contributions from the Jefferson Physical Laboratory of Harvard University which appeared in the March number of the *Proceedings of the American Academy of Arts and Sciences*. Amongst them is one on certain thermal properties of steam by Mr. H. N. Davis, in which the author, after a critical examination of the experimental work on the subject done during the last twenty years, comes to the conclusion that the total heat of saturated steam up to 190° C. is best represented by the expression

$$H = H_{100} + 0.3745(t - 100) - 0.00099(t - 100)^2,$$

where  $H_{100}$  has the most probable value 639.11. Outside this range of temperature the latent heat  $L$  is best given by an equation of the form suggested by Thiesen, i.e.  $L = 92.93(365 - t)^{0.315}$ , in which 365° is the critical temperature of steam. The question of the true value of the specific heat of steam at constant pressure cannot be settled on the contradictory experimental data at present available.

MESSRS. A. GALLINKAMP AND CO. (19 and 21 Sun Street, E.C.) have just issued a circular containing a description of a technical series of physical apparatus. The majority of the items described are connected with the subject of heat, and relate to the determination of coefficients of expansions of solids, liquids, and gases, vapour pressures, and specific heats. A simple apparatus for the rapid determination of specific heats consists of a Dewar flask which contains a hot liquid; into this the cold body under test is dropped, and the fall of temperature is noted; the procedure is therefore the converse of that usually adopted in the method of mixtures. The use of the Dewar flask enables this to be done without sensible error. A lecture apparatus to illustrate Carre's ice machine is designed to

overcome the difficulty experienced by lecturers in causing water to freeze by its own evaporation. A glass tube 50 cm. long and 5 cm. diameter is closed at both ends and filled with coarse glass wool to give more surface. A lateral tube near one end connects with a round-bottomed flask (or, better still, with a Dewar flask); another lateral tube near the other end connects with an exhaust pump. The flask is first half-filled with water, and the glass wool is saturated with fresh strong sulphuric acid. The formation of ice is very rapid. Grace's apparatus for determining the mechanical equivalent of heat also deserves mention as being a cheap pattern of the modern rotating cylinder form of apparatus for this purpose.

THE May number of *Knowledge* appears under new auspices. The editors are now Mr. Wilfred Mark Webb and Mr. E. S. Grew; and Hardwicke's *Science Gossip* is incorporated with the journal, as well as *Illustrated Scientific News*. In an introductory note Principal Miers gives encouragement to scientific amateurs to pursue their observational work in spite of the gulf that may exist between them and the trained specialist. In astronomy and natural history particularly, the work of amateurs is often of great value to science, and any efforts made to stimulate it must be appreciated by professional men of science. The new number of our contemporary should be of assistance in this direction. There are several fine illustrations in the form of plates and other figures, and the articles are by contributors who write with authority and not as the scribes. Among the astronomical articles we notice one on Halley by Mr. T. A. Bellamy, a characteristic contribution by Mr. J. E. Gore on counting the stars, and a description of Prof. Lowell's observations of Martian canals. Dr. D. H. Scott, F.R.S., writes upon the earliest flowering plants—a subject which he has made his own—Prof. F. Cavers upon liverworts, and Prof. A. W. Porter upon electromagnetic mass. There are also the usual notes upon recent advances in the various departments of science, and reviews of books. We offer our congratulations to the editors upon the attractive character of their first number, and trust that their efforts to promote and extend intelligent interest in science will meet with success.

BOTANISTS alone, so far as we are aware, have a journal dealing purely with the jests and humours of their subject. The first number of the *Sportophyte*, edited by Dr. Marie Stopes, emanates from Manchester University, and is to appear yearly. It contains anecdotes, verse, and articles parodying serious journals, of which the highly technical and friendly humour will appeal to professional botanists.

THE first part of a catalogue of books on natural history, to be obtained from Mr. Francis Edwards, 75 High Street, Marylebone, W., has been received. It is concerned with miscellaneous and general books and those dealing with ornithology and oology. The second part of the catalogue will deal with works on botany, gardening, ichthyology, and other subjects.

### OUR ASTRONOMICAL COLUMN.

TOTAL SOLAR ECLIPSE OF MAY 9.—According to the *Daily Mail* of May 19, Mr. Driffield, a surveyor, reported to Mr. Baracchi, director of the Melbourne Observatory, that he observed the solar eclipse of May 9 at Queenstown, Tasmania, in clear weather. According to him, the corona appeared regular in form, concentric with and evenly distributed around the moon's disc, except in the

south-eastern quadrant, where two streamers were seen running straight for some distance, and then curving downward like a plume. The extent of the corona was more than half a degree from the limb. Its structure was striated, the colours merging gradually from deep orange to pale green. The streamers were two moon's diameters in length. Mr. Baracchi is recorded to have said that this is the best observation which was obtained.

SOLAR ACTIVITY.—After a period of quiescence the sun has, during the past week, exhibited a recrudescence of spot activity. Several moderately sized groups have been observed containing well-defined extensive umbræ.

COMET 1910a.—According to an ephemeris published by Prof. Kobold in No. 4410 of the *Astronomische Nachrichten*, comet 1910a is still almost stationary to the west of the Great Square, and its estimated magnitude is about 12.0. For May 27 its position is given as

$$\alpha \text{ (1910-0)} = 22\text{h. } 31.5\text{m.}, \delta = +29^\circ 29.8'.$$

THE PROBLEM OF THE RESISTING MEDIUM.—In No. 4408 of the *Astronomische Nachrichten* Mr. Selig Brodetsky, of Cambridge University, discusses Prof. See's assumptions concerning the possible part played by a resisting medium in the capture of satellites. In conclusion, he shows that the arguments employed by Prof. See will not stand close analysis, and are such as to render the possibility of capture, with an assumed resisting medium, very uncertain. That such a satellite as the moon was captured in the manner suggested appears to be extremely improbable; while some of the larger planets have apparently been able to capture a number of comets, rendering them periodic, there is no known case in which the earth has been able to perform a similar operation.

THE CALCIUM BANDS AT  $\lambda$  6382 AND  $\lambda$  6389.—In the spectra of sun-spots the calcium bands with heads at  $\lambda\lambda$  6382 and 6389 are an important feature, to which attention was directed by Prof. Fowler, but their precise origin is not quite settled. Investigations on this point have been carried out by Prof. Barnes at Bryn Mawr College, who describes his latest results in No. 2, vol. xxxi., of the *Astrophysical Journal*.

In dry air at atmospheric pressure, and with pure metallic poles, these bands do not appear in the arc spectrum, but with the pressure reduced to 3 cm. of mercury, or less, they come out strongly. In atmospheres of dry hydrogen and pure dry nitrogen the bands do appear, but not so strongly as when the arc is run *in vacuo*; with the arc burning in  $\text{SO}_2$  they do not appear.

It has been suggested that these bands are due to a compound of calcium and hydrogen, but, from his experiments, Prof. Barnes concludes that they may be considered as true metallic radiations, a conclusion which is important in discussing the probable origin of the sun-spot spectrum.

STARS WITH VARIABLE RADIAL VELOCITIES.—In No. 2, vol. xxxi., of the *Astrophysical Journal*, Mr. O. J. Lee publishes the results of recent observations of radial velocities with the Bruce spectrograph at the Lick Observatory. For  $\alpha$  Cygni a range of 9 km., from  $-9.0$  to  $-0.1$  km., was found, but the observations do not suggest a period. Two members of the Taurus stream of stars discovered by Prof. Boss, Nos. 1007 and 1092 in his catalogue, have also been shown to vary their radial velocities. The first is 58 Tauri, the range of its velocity being from  $+41$  to  $+15$  km., and the second is B.D.  $7^\circ$  681 Tauri, which exhibits a range of from  $+34$  km. to  $+17$  km.  $\theta$  Pegasi is also shown to be a spectroscopic binary with a range of from  $-32$  to  $+19$  km., and on one plate shows a very faint component at  $+62$  km.

OCCULTATION OF MARS BY THE MOON ON APRIL 13.—Through a break in the clouds Dr. W. Krebs was able to observe the last contact during the occultation of Mars by the moon on April 13, and, in No. 4407 of the *Astronomische Nachrichten*, he gives the time as 10h. 49m. 30s.  $\pm$  15s. (G.M.T.).